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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/575,740

04/13/2006

Mary T. Zoeckler

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UNION CARBIDE CHEMICALS AND PLASTICS TECHNOLOGY
CORPORATION

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MIDLAND, MI 48641-1967

EXAMINER

CHOI, LING SIU

ART UNIT

PAPER NUMBER

1713

MAIL DATE

DELIVERY MODE

06/29/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/575,740	Applicant(s) ZOECKLER ET AL.	
	Examiner Ling-Siu Choi	Art Unit 1713	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 April 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>03/29/2007</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

1. Claims 1-16 are now pending, wherein claims 1-3 are drawn to a Ziegler-Natta catalyst precursor composition; claims 4-7 are drawn to a process to prepare a Ziegler-Natta precursor composition; claims 8-13 are drawn to a catalyst composition; claim 14 is drawn to a process for forming a Ziegler-Natta catalyst composition; and claims 15-16 are drawn to an olefin polymerization process.

Claim Objections

2. Claim 4 is objected to because of the following informalities: claim 4, line 2, "transition metal compound" is suggested to be changed to --transition metal compound other than titanium--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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4. Claims 8-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 8, lines 5-6, the recitation "an organoaluminum halide, and organoboron halide, or a mixture thereof" causes indefiniteness because it can be interpreted as follows: "an organoaluminum halide, an organoboron halide, **or** a mixture thereof" or "an organoaluminum halide **and** an organoboron halide".

Claim Analysis

5. Summary of claim 1:

A Ziegler-Natta catalyst precursor composition comprising the <u>spray-dried reaction product of</u>	
	a magnesium compound
	a non-metallocene titanium compound
	at least one non-metallocene compound of a transition metal other than titanium

Summary of claim 4:

A process for preparing a Ziegler-Natta precursor composition comprising	
A	forming a solution of a magnesium, titanium, and transition metal compound in a primary diluent
B	<u>spray drying</u> the liquid composition to form solid particles of the precursor composition

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Summary of claim 8:

A catalyst composition comprising a solid mixture formed by halogenation of	
(A1)	a <u>spray-dried catalyst precursor</u> comprising the reaction product of (a) a magnesium compound, (b) a non-metallocene titanium compound, and (c) at least one non-metallocene compound of a transition metal other than titanium , with
(A2)	a halogenating agent comprising an organoaluminium halide, an organoboron halide, or a mixture thereof.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –
 (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1-11 and 14-16 are rejected under 35 U.S.C. 102(e) as being anticipated by Wagner et al. (US 6,982,237 B2).

Wagner et al. disclose a spray-dried catalyst precursor obtained by (A) providing a mixture or reaction product of **magnesium halide**, a solvent, an electron donor, and a transition metal compound which is selected from Groups 3-10 and lanthanides; (B)

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contacting the mixture or reaction product with an inert filler to form a slurry; and (C) **spray-drying the slurry**, wherein the inert filler can be **silicon dioxide**, titanium dioxide, zinc oxide, magnesium carbonate, magnesium oxide, carbon, or calcium carbonate and has a median particle size of about 10 μm to about 60 μm ; and the transition metal compound can be **a combination of a titanium compound and a hafnium compound** (col. 11, lines 41-52; claims 1, 7-8, and 15). Wagner et al. further disclose that the spray-dried catalyst precursor further comprises a Lewis acid in the formula of $\text{R}_g\text{MX}_{3-g}$ with M being aluminum or boron, which is exemplified to be triethyl aluminum or $\text{B}(\text{C}_2\text{H}_5)\text{Cl}_2$ - an organoboron halide (claims 21-24). Wagner et al. furthermore disclose a catalyst for polymerizing olefin, comprising the spray-dried catalyst precursor and a cocatalyst (claim 3). Thus, the present claims are anticipated by the disclosure of Wagner et al.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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9. Claims 1-5 and 8-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jorgensen et al. (US 5,290,745) in view of Masi et al. (EP 0 449 355 A2).

Jorgensen et al. disclose a catalyst system comprising (A) an organoaluminum compound which can be $\text{Al}(\text{C}_2\text{H}_5)_2\text{Cl}$ or $\text{Al}_2(\text{C}_2\text{H}_5)_3\text{Cl}_3$ and (B) a titanium trichloride component prepared by (i) reducing titanium tetrachloride with magnesium metal in an electron donor solvent; (ii) adding additional magnesium dichloride to the resulting solution; and (iii) spray-drying the solution with a filler to obtain discrete particles of catalyst (col. 6, lines 36-40; claim 1).

The difference between the present claims and the disclosure of Masi et al. is the requirement of a non-metallocene compound of a transition metal other than titanium.

Masi et al. disclose a supported catalyst for olefin polymerization in the presence of a catalyst comprising (a) an organometallic compound of aluminum and (B) a second component obtained by bring a magnesium compound, a titanium compound, and a hafnium compound with a porous support, wherein the molar ratio of Mg/Ti/Hf is 2/1/1.5 (abstract; page 4, lines 18-22; Example 4). It is noted that the use of a combination of different transition metal compounds as catalysts in olefin polymerization will result in a polyolefin having a broad molecular weight distribution (page 2, lines 3-27). In light of such benefit, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a combination of a titanium compound and a hafnium compound in the disclosure of Jorgensen et al. and thereby obtain the present invention.

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10. Claims 1-5, 8-11, and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hwu et al. (EP 0 783 007 A2) in view of Masi et al. (EP 0 449 355 A2).

Hwu et al. disclose a catalyst precursor for olefin polymerization, obtained by spray - drying a mixture of a titanium compound, a magnesium compound, a support, and an electron donor (page 3, lines 10-16 and 34-58; page 4, lines 1-5). Hwu et al. further disclose a catalyst comprising a catalyst precursor and a cocatalyst which is triethylaluminum (page 4, lines 6-13).

The difference between the present claims and the disclosure of Hwu et al. is the requirement of a non-metallocene compound of a transition metal other than titanium.

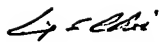
Masi et al. disclose a supported catalyst for olefin polymerization in the presence of a catalyst comprising (a) an organometallic compound of aluminum and (B) a second component obtained by bringing a magnesium compound, a titanium compound, and a hafnium compound with a porous support, wherein the molar ratio of Mg/Ti/Hf is 2/1/1.5 (abstract; page 4, lines 18-22; Example 4). It is noted that the use of a combination of different transition metal compounds as catalysts in the olefin polymerization will result in a polyolefin having a broad molecular weight distribution (page 2, lines 3-27). In light of such benefit, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a combination of a titanium compound and a hafnium compound in the disclosure of Hwu et al. and thereby obtain the present invention.

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Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ling-Siu Choi whose telephone number is 571-272-1098.

If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reach on 571-272-1114.



LING-SUI CHOI
PRIMARY EXAMINER

June 25, 2007